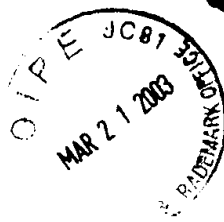


HACKB'S
CHEMICAL
DICTIONARY



HACKH'S CHEMICAL DICTIONARY

[*American and British Usage*]

*Containing the Words Generally Used in Chemistry,
and Many of the Terms Used in the Related
Sciences of Physics, Astrophysics, Mineralogy,
Pharmacy, Agriculture, Biology,
Medicine, Engineering, etc.*

Based on Recent Chemical Literature

FOURTH EDITION

Completely Revised and Edited by

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hydrochloric acid (the *kinase*) into pepsin (the *active enzyme*). (3) Excitation. (4) Irradiation. (5) A. of carbon, e.g., by heating with steam, or sulfuric acid.

activator. (1) A catalyst. (2) A substance used in flotation to produce a coating having metallic properties, as, sodium sulfide for lead carbonate ores.

activatory. See *phase*.

active. (1) Dynamic or working, as opposed to static or inert. (2) Having optical properties, as an asymmetric carbon atom. Cf. *optical activity*. **surface-** See *surfactant*.

a. deposit. The formation of a radioactive layer on a substance exposed to radio elements. **a. immunity.** The stimulation of an organism to produce substances protective against infection by bacteria. **a. immunization.** The processes by which the protective agencies of an organism are made resistant to bacterial invasion. **a. mass.** The number of moles (gram molecules) in a unit volume (1 liter). **a. oxygen test.** A test for rancidity in fats, by the liberation of iodine from potassium iodide in acetic acid. **a. principle.** The substance responsible for the physiological action of a drug; e.g., an alkaloid.

activin. An organic iodine compound of casein used medicinally.

activity. (1) The rate in watts at which work is performed. Cf. *action*. (2) The ratio of the escaping tendency (*fugacity*) of two phases at the same temperature. A correction applied to the concentration of a strong electrolyte, to satisfy Ostwald's dilution law, q.v. (3) A measure of ionic forces. Cf. *a. coefficient*. **amylolytic-** Digestive power of amylase. **excited-** Active deposit. **ionic-** Thermodynamic concentration. In a dilute solution which obeys the gas laws, the i.e. equals the concentration; in other solutions the value which ensures that the gas laws hold. **optical-** The capacity of a substance to rotate the plane of polarized light. **peptic-** Digestive power of pepsin. **radio-** See *radioactivity*. **tryptic-** Digestive power of trypsin.

a. of activated carbon. The percentage of carbon disulfide vapor absorbed by carbon (generally 50%).

a. coefficient. The ratio *a/c*, see *activity* (2).

actol. Silver lactate.

actomyosin. A combination of actin and myosin, q.v., which comprises the tractile muscle system.

acton. Ethyl orthoformate.

actor. A compound which takes part in both primary and secondary reactions. See *induced reactions*.

acute. Quick, short, or sharp. Cf. *chronic*. **a. poisoning.** See *poisoning*.

acyclic. Describing organic compounds which contain no ring system; as, the methane series. Synonym: Aliphatic (chains). Antonym: Cyclic, aromatic (rings).

acyl. An organic radical derived from an organic acid by the removal of the hydroxyl group; e.g., $R\cdot CO\cdot$ is the a. radical of $R\cdot CO\cdot OH$. See *acetyl*, *benzenesulfonyl*, *benzoyl*, etc. **a. derivative.** An organic compound containing an a. radical; e.g., amides, $R\cdot CO\cdot NH_2$. **a. radical.** Acyl.

acylation. Acidylation. The formation or introduction of an acyl radical in or into an organic compound.

acyloin. $R\cdot CO\cdot CHOH\cdot R$. An organic compound formed by condensation of aldehydes, as, $Ph\cdot CO\cdot CHOH\cdot Ph$, benzoin.

aczol. An ammoniacal solution of zinc and copper phenolates; a wood preservative.

adaline. $Et_2CBr\cdot CO\cdot NH\cdot CO\cdot NH_2 = 237.1$. Carbromal, α -bromo- α -ethylbutyrylurea. White crystals, m.116, slightly soluble in water; a hypnotic and sedative.

adamant. A hard mineral; as, diamond.

adamantine. Diamond. **a. boron.** See *boron*. **a. spar.** A dark gray, smoky variety of corundum from India; green in transmitted light.

adamellose. An igneous andesite-diorite rock containing hornblende, feldspar, quartz, chlorite, agnetite, apatite, and rutile (Pigeon Point, Minn.).

Adam galactometer. A graduated buret with two glass bulbs, used in milk analysis.

adamine. Adamite.

adamite. Zn_2HAsO_5 . Adamine. A native arsenate; yellow orthorhombic crystals (Chile, Greece).

Adamkiewicz reaction. Protein solutions give a violet ring when layered on glacial acetic acid and concentrated sulfuric acid.

adamon. Dibromodihydrocinnamic acid ester of borneol; a sedative and anaphrodisiac.

adamsite. (1) A greenish-black mica. (2) Diphenylamine chlorarsine. *Adansonia*. *Adansonia digitata* (Bombacaceae), the baobab tree of Africa, yields edible hom or monkey bread. The bark is an emollient; the dried leaves, lalo, are an antipyretic; the fibers are suitable for paper.

adansonine. An alkaloid from the bark and leaves of *Adansonia digitata*. Colorless white crystals; a febrifuge.

adaptation. The advantageous adjustment of an organism to a change in its surrounding.

adapter. A tapered glass tube used to connect a retort or condenser with the receiving vessel.

adatom. An atom adsorbed on a surface so that it will migrate over the surface like a two-dimensional gas. Cf. *adion*.

addiction. Devotion to or the habitual use of a substance or practice. **a.-producing drugs.** Drugs subjected to international control by the World Health Organization because of their a.-producing powers.

addition. A chemical reaction which involves no change of valency; usually the union of two binary molecules to form a more complex compound; as, $HCl + NH_3 \rightleftharpoons NH_4Cl$. **a. compound.** Adduct. An inorganic compound formed by addition; e.g., NH_4Cl .

additive. Added to. **a. compound.** An organic compound formed by the saturation of one or more double or triple bonds of an unsaturated compound; e.g., benzene hexachloride, $C_6H_6Cl_6$, is an additive compound of benzene. **a. property.** A property of a molecule which is the sum of the individual properties of the atoms or linkages composing it; thus, when the molecular refractivity of a molecule is the sum of the atomic refractivities of its atoms.

adduct. Addition group or compound.

adduction. Oxidation.

adelgesin. $C_{23}H_{28}O_{15} = 544.3$. Light brown needles, m.205. A glucosidal constituent of the bark of "pineapple" gall, produced by *Adelges abietis*.

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Colorless liquid with characteristic odor, b.46.2, slightly soluble in water; a local anesthetic, and a solvent for sulfur, iodine, rubber. **c. group.** The fourth group of the periodic system, q.v. **c. hexachloride.** $C_2Cl_6 = 236.77$. *C. trichloride*, ethyl perchloride, hexachloroethane. Colorless crystals, m.182, b.187, insoluble in water. **c. isotopes.** *C.* has 5 isotopes of atomic weights 10-14; C^{12} and C^{13} only are stable. C^{13} is used as a tracer element in nutritional work. **c. light.** An electric arc light with *C.* electrodes. **c. monosulfide.** $CS = 44.04$. Colorless gas, b.-130, very unstable and polymerizes to a red solid. **c. monoxide.** $CO = 28.01$. Colorless poisonous gas, b.-190, slightly soluble in water, formed during incomplete combustion of *C.* **c. oxysulfide.** $COS = 60.07$. Carbonyl sulfide. Colorless gas, b.50.2, slightly soluble in water, explosive in air. **c. paper.** A tissue paper coated with a mixture of a wax and a black pigment (often *c. black*); used to make copies of writing. **c. print.** A photographic process for artistic reproductions of negatives. **c. residue.** Conradson *c.* The amount of *c.* produced from a lubricating oil heated in a closed crucible under standard conditions. **c. subnitride.** Acetylene dinitrile. **c. suboxide.** $O:C:C:O = 68.02$. A pungent lacrimatory colorless gas, b.7, decomp. by water to malonic acid. **c. subsulfide.** $C_3S_2 = 190.0$. Red pungent liquid, m.-0.5, polymerized by heat. **c. tetrabromide.** $CBr_4 = 331.85$. Tetrabromomethane*. Colorless scales, d.3.42, m.92, insoluble in water. **c. tetrachloride.** $CCl_4 = 153.84$. Tetrachloromethane*, phenoxin, Pyrex. Colorless liquid, b.76, slightly soluble in water. A local anesthetic, fire extinguisher, nonflammable solvent, cleaning agent, (benzene-substitute), and reagent. **c. tetrafluoride.** $CF_4 = 88.0$. Tetrafluoromethane*, fluoromethane. Colorless gas, b.-126, by-product in the manufacture of aluminum from cryolite. **c. tetraiodide.** $CI_4 = 519.84$. Tetraiodomethane*. Red crystals, d.₂₀4.32, decomp. by heat, insoluble in water. **c. trichloride.** Hexachloroethane.

carbonaceous. Containing carbon.

carbonado. Bort. A hard, black cutting diamond.

carbonatation. Formation of carbonates by carbon dioxide. Cf. *carbonation*.

carbonate. A salt of the theoretical carbonic acid, containing the radical CO_3^{2-} . Carbonates are readily decomposed by acids. The carbonates of the alkali metals are water-soluble; all others are insoluble. **bi-** Acid *c.* A salt containing the radical HCO_3^- . **chloro-** See *chloro-c.*

c. minerals. Rock-forming minerals; as, calcite, $CaCO_3$; dolomite, $CaMg(CO_3)_2$; magnesite, $MgCO_3$; siderite, $FeCO_3$.

carbonation. (1) Carbonization. (2) The precipitation of lime by carbon dioxide, e.g., in sugar refining. (3) The saturation of water with carbon dioxide, e.g., in soda-water manufacture.

carbonic. A compound containing tetravalent carbon. Cf. *carbonium*.

carbonic acid. (1) $HO-COOH$. *m*-Carbonic acid, hydroxyformic acid. The hypothetical acid of carbon dioxide and water; known only as its salts (carbonates), acid salts (bicarbonates), amides (carbamic acid) and acid chlorides (carbonyl chloride). (2) An old term for carboxylic acid.

ortho- $C(OH)_4$. Exists only as compounds, e.g., esters.

c. acid ester. An organic compound in which the H of *c. acid* is substituted by a radical. *meta-* Compounds of the general formula $RO-CO-OR$. *ortho-* Compounds of the general formula $C(OR)_4$. **c. acid hydrate.** $CO_2 \cdot 6H_2O$.

carbonic anhydrase. An intracellular enzyme occurring in high concentrations in red-blood corpuscles. It catalyzes the reversal of the reaction $CO_2 + H_2O \rightleftharpoons H_2CO_3$.

carbonic anhydride. Carbonic acid.

carbonic ester. Carbonic acid ester. **ethyl-** $CO(OEt)_2 = 118.1$. Colorless liquid, b.126. **ethylene-** $CO(OC_2H_5)_2 = 114.1$. Colorless crystals, m.39. **methyl-** $CO(OMe)_2 = 90.1$. Colorless liquid, b.91. **methylethyl-** $EtO-CO-OMe = 104.1$. Colorless liquid, b.109. **methylpropyl-** $PrO-CO-OMe = 118.1$. Colorless liquid, b.131.

carbonic ether. Ethyl carbonate.

carbonide. Carbide.

carboniferous. (1) Containing carbon. (2) Belonging to the coal age, see *geologic era*.

carbonite. (1) Small charcoal briquettes. (2) A high explosive: nitroglycerin 17-30, sodium nitrite 24-30, flour 37-44%.

carbonitrile. Cyanide, nitrile. The radical $\cdot CN$, indicated by the prefix *cyano-*, or the suffix *-nitrile* or *-carbonitrile*.

carbonium. Describing: (1) a compound with divalent or trivalent carbon, associated with chemical color and reactivity; (2) the ion R_3C^+ .

carbonization. (1) The transformation of organic matter into charcoal. (2) The distillation of coal, as in gas manufacture. **high temperature-** Heating coal out of air at 1000-1300°C, with the formation of gas, tar, oil, ammonia, and coke. **low temperature-** Heating coal at 450-700°C, with the formation of gas, petroleum (hydrocarbons from pentane to octane), and amylene to octene), and coke.

carbonize. To convert to carbon by charring or burning incompletely.

carbonizer. Concentrated aluminum chloride solution; removes cellulose from wool.

carbonoid. A suggested tetragonal structure of carbon, with 4 faces, one for each valency. Cf. *benzenoid*.

carbonometer. A device to determine the carbonic acid content of blood. Cf. *carbometer*.

carbonoxysulfide. Carbon oxysulfide.

carbon rheostat. An electrical resistance consisting of a number of carbon plates mounted so that pressure can be placed on them by a screw and their total resistance thus altered.

carbonyl. The radical $\cdot CO$. Cf. *carbonyls*, *thionyl*.

c. amidophenol. Oxybenzazole. **c. bromide.** $COBr_2 = 187.83$. Bromophosgene. Poisonous liquid, b.64.5. **c. chloride.** $COCl_2 = 98.92$. Phosgene. Poisonous gas, b.8.2, decomp. by water; an important chemical intermediate, e.g., in the manufacture of polyurethane resins. World production (1960), 10,000 tons. **c. dioxy.** The radical $\cdot O-CO-O$. **c. diurea.** $(NH_2-CO-NH)_2CO = 146.06$. Triuret. White crystals, m.232, insoluble in water. Cf. *biuret*. **c. hemoglobin.** A highly poisonous combination of carbon monoxide and hemoglobin. **c. pyrrole.** $CO(C_4H_4N)_2 = 160.1$.

Colorless crystals, m.63. **c. sulfide**. Carbon oxy-sulfide. **c. thiocarbonanilide**. $C_6ON_2SPh = 254.1$. Colorless crystals, m.87. **thio-c. thiocarbonanilide**. $C_6N_2S_2Ph_2 = 270.1$. Colorless crystals, m.79.

carbonyles. Carboxides. Compounds of carbon monoxide and metals, some volatile; as, nickel carbonyl.

carboraflin. An activated charcoal, used chiefly for decolorizing sugar solutions.

Carborundum. Trademark for certain silicon carbide and other abrasives.

carbosant. $(C_{15}H_{23}) \cdot O \cdot COO(C_{15}H_{23}) = 466.37$. Santalyl carbonate. Carbonic acid ester of sandalwood oil. Yellow oil, insoluble in water.

Carbosorb. A grade of Ascarite.

carbostyryl. $C_9H_7ON = 145.15$. 2-Hydroxyquinoline, 2(1)-quinolone. Colorless prisms, m.199, slightly soluble in water. **ethyl-** See *ethyl-c. hydro-*. $C_9H_9ON = 147.15$. Colorless crystals, m.163. **hydroiso-** $C_9H_9ON = 147.15$. Crystals, m.71. **iso-** $C_9H_9ON = 145.15$. Crystals, m.208. **methyl-** Lepidone. **nitro-** $C_9H_6O_3N_2 = 190.2$. Colorless crystals, m.168. **octohydro-** $C_9H_{15}ON = 153.19$. Crystals, m.151. **oxy-** $C_9H_7O_2N = 161.16$. Colorless crystals, m.300. **pseudo-** $C_9H_9ON = 145.15$.

carbostyrylic acid. Kynuric acid.

Carboxide. (1) Trademark for a mixture of ethylene oxide 1 and carbon dioxide 9 pts; a fumigant for insects in grain, tobacco, etc. (2) (not cap.) Carbonyl (obsolete). (3) (not cap.) The keto group.

carbox metal. The alloy: Pb 84, Sb 14, Fe 1, Zn 1%.

carboxy. Carboxyl.

carboxyhemoglobin. A compound of carbon monoxide and hemoglobin formed in the blood by carbon monoxide poisoning.

carboxyl. Oxatyl, carboxy. The acidic $-COOH$ group. It determines the basicity of an organic acid. **c. nitrogen**. See *nitrogen*.

carboxylase. A yeast enzyme which splits the carboxyl group into carbon dioxide. **co-** Vitamin B_1 pyrophosphate.

carboxylic acid. A compound of the type $R \cdot COOH$. See *acids*, *carbazylic acid*. Cf. *carbylic acid*.

carboxymethylcellulose. See *sodium c.m.c.*

carboy. Demijohn. A 10- to 13-gal glass flask protected by wickerwork; used for acids, etc.

c. inclinor. A support to enable a c. to be inclined and emptied easily.

carbomal. Adaline.

carbo process. A method of making color prints from color photographs.

Carbrosolide. Trade name for silicon carbide.

carburation. (1) Carbonization as applied to internal combustion engines. (2) Carburization.

carburet. Carbide.

carburetor, carburettor. (1) A device for making illuminating gas by spraying oil on hot surfaces over which water gas passes. (2) The part of the internal combustion engine where full vaporization occurs.

carburite. A mixture of equal parts carbon and iron, for recarbonizing steel in the electric furnace.

carburation. The dissolution of carbon in molten metals; as, steel produced by heating in a stream of carbon monoxide. **case-** Carburization on the surface.

c. gas. The production of a toughened surface layer of high-carbon steel by heating steel components in a carbon-rich gas.

carburizing. Carburization.

carburoolith. A solid safety fuel which excludes flammable vapor under pressure. It consists of petrolum with 3% of a stabilizer (sodium silicate mixed with copper alginate and an excess of ammonia).

carbylamine*. (1) Isoocyanide. (2) Ethylisocyanide.

carbylic acid. An organic acid which has carbon in its acid radical; as: **ammonia-** $R \cdot CNH \cdot NH_2$, carbylic. **aquo-** $R \cdot COOH$, carboxylic. **thio-** $R \cdot CSSH$, dithionic. Cf. *siliconic acid*, *stannonic acid*.

carcel unit. The brightness of the carcel lamp, burning 42 gm of colza oil per hour. 1 carcel unit = 9.6 candles = 7.5 German standard candles, q.v.

carcinogen. A substance which produces cancer in living tissues; as, benzopyrene.

carcinolipin. A crystalline lipid factor in egg yolk having carcinogenic properties.

carcinoma. A tumor originating from malignant epithelial cells, e.g., skin cancer (epithelioma).

carcinomic acid. An unsaturated fatty acid in cancerous serum and tissue.

cardaissin. A substance extracted from suprarenal glands of cows, a heart stimulant.

cardamom. The seeds of *Elettaria cardamomum* (Zingiberaceae), tropical Asia; an aromatic and a spice. **c. oil**. The essential oil of c., d.0.895-0.905; it contains terpinene, dipentene, and limonene. **Malabar-** d.0.933-0.943; contains cineol. **Siam-** d.0.905; contains borneol.

Cardanol. $C_{26}H_{32}O = 288.30$. $m \cdot C_{11}H_{17} \cdot C_6H_4 \cdot OH$. Trademark for a liquid obtained by the distillation of cashew-nut juice, b.p.m.225. Its esters are plasticizers.

cardanolide. Cardogenan. Describing the fully saturated system of digitaloid lactones; the configuration at the 20-position is the same as in cholesterol. Cf. *steroid*.

cardiac. Pertaining to the heart (*καρδία* = heart).

c. sedative. A drug which lessens the frequency of heart action, as, aconite. **c. stimulant**. A drug which increases the force and frequency of the heartbeat, as, digitalis.

cardiazole. Pentamethylenetetrazole.

carding. An operation in the manufacture of woolen felts which opens up the material, mixes the fibers, and removes foreign matter, by the action of wire brushes.

cardiogram. The tracing produced by a cardiograph.

electro- A photographic record of the electric heart currents, which deflect a galvanometer mirror that reflects light onto photographic paper.

cardiograph. A device to record the movement of the heart, especially its force and character; a small diaphragm placed over the heart or artery transmits the heartbeat by air pressure to a recording diaphragm. **electro-** A sensitive galvanometer to measure the electric pulsations of the heart.

cardioid. Heart-shaped. **c. condenser**. A device to concentrate light in the ultramicroscope.

cardogenan. Cardanolide.

Cardol. $C_{21}H_{39}O_2 = 314.3$. Trademark for an irritant phenolic oil liquid from the shell of *Anacardium occidentale*, cashew nuts.

carene. $C_{10}H_{16} = 136.2$. 4,7,7-Trimethyl- Δ^3 -nor-carene. A terpene group in essential oils. d. Colorless, sweet-smelling oil, d.0.8586, b.170; in Indian turpentine.

Carex. Red (Cyperaceae).

Cargau. Trade name for casein; a gelatinous substance (Cariacae).

Carica. The (Cariacae).

caric. Kryptoxanthin.

caricin. (1) Cf. *papain*.

carigenetic. genetic.

Carissa. A genus of Asia and Africa.

carissin. A stimulant.

caritinoid. Cf. *Carius*, *Georg*.

C. furnace. tubes.

carlic acid. Cf. *Penicillium*.

carlosic acid. fungus, *Penicillium*.

Carlsbad salt. sal thermarum by evaporated Karlovy Vary.

Artificial. Sulfate 2, sodium 36%.

Carl's solution. alcohol, 60; acetic acid, 2.

carminative. gas expulsi-

carmine. Cochineal. A mixture of stannous obtained cochineal with soluble in an ammonia- A blue- See *indigo*. containing *indigo*. See *indigo*.

c. lake. A $C_{11}H_{12}O_7$ split product.

carminic acid. glucosidal hydrocochineal. P water; a refractometer at pH 5.5 red (acid).

carminite. A arsenates, and

carmoisine. A carmalite. KCl potassium, many). Cf. $MgCl_2 \cdot NH_4Cl$.

carnauba. (1) *Ceriferia*; or (2) Brazil wax, obtained from masses, m.83.

carnaubic acid. Cf. wax and beef